SECTION 23

PASSENGER ELEVATORS

23.1 REFERENCES

(23A) AMERICAN BUREAU OF SHIPPING, *Guide for Construction of Shipboard Elevators (1975)*

(23B) ASME A17.1/CSA B44 –2004, *Safety Code For Elevators and Escalators*

(23C) AMERICANS WITH DISABILITIES ACT (ADA), *ADA Accessibility Guidelines for Buildings and Facilities (ADAAG),* as amended through September 2002

(23D) *Draft Passenger Vessel Accessibility Guidelines and Supplementary Information,* dated November 26, 2004

(23E) OSHA, Safety Regulations

(23F) Code of Federal Regulations - 46 CFR – *Shipping*

(23G) AWS D.1.1, *Structural Welding Code – Steel*

(23H) ASTM F916, *Standard Specification for Elevators, Shipboard, Electromechanical Passenger, and Stores*

23.2 INTRODUCTION

This Section contains the Contractor Design and Provide general requirements for two (2) Marine Passenger Elevators which are intended primarily to convey Passengers with reduced mobility, including, but not limited to, those in wheelchairs and/or with sight and hearing disabilities. Accordingly, minimizing obstructions and ease of use are paramount to their operation. The elevators will also be used to convey Passengers from the Lower Vehicle Deck to the Sun Deck, and all decks in between. The Passenger elevators shall have a minimum rated load capacity of 2,000 pounds.

For WSF Fleet-wide Standardization purposes, End No. 1 of the Vessel shall always be considered the bow, and this designation shall delineate port and starboard, fore and aft wherever they are addressed in the Technical Specification.

23.3 GENERAL

The Contractor shall host an Elevators Design & Installation Kick-off Conference at its facility within fifteen (15) days after execution of the Contract. The Contractor shall provide a facility for the Elevators Design & Installation Kick-off Conference of adequate size to accommodate ten (10) to fifteen (15) WSF personnel, L&I personnel, elevator manufacturer personnel, and as many Contractor personnel as considered necessary by the Contractor. The purpose of this conference is to bring all parties involved in the installation of the approved elevator systems, and for the Contractor and his elevator contractor to present to the WSF Representative a detailed plan and schedule for construction, installation, inspection, testing, approval, and certification of the elevators **prior** to delivery of each Vessel. The Contractor shall detail its dialog with all cognizant Authoritative Agencies and the permitting process for certification of the elevators.

BE ADVISED: Prior to starting construction, the Contractor shall obtain an elevator installation permit from the Washington State Department of Labor and Industries (L&I), and post it at the work site.

Design and provide two (2), L&I approved, MacGREGOR KONE, or equal, Marine Passenger elevators and all required ancillary equipment and interfaces. One (1) elevator shall be provided on each End of the Vessel, on opposite sides, each served by a dedicated thirty-six (36) inch wide ADA Access Path from the brow.

The elevators module installation shall be provided under the supervision of the elevator manufacturer's technical representative and in strict accordance with **all** applicable regulatory

requirements including References (23A) through (23H), and the *Physical Characteristics* Subsection in this Section of the Technical Specification, with special emphasis on 46 CFR §72.05 and §111.91. In cases of conflict, the more stringent requirement shall prevail.

General requirements for elevator module foundation and other structural construction to support the elevator installation are described in Sections 2 and 3 of the Technical Specification.

Requirements for insulation and linings associated with the elevators are described in Section 7 of the Technical Specification.

All Work shall be properly painted by the Contractor after installation as described in Section 14 of the Technical Specification.

Where required by the Technical Specification to conform to certain standards, like those by MARAD, USCG, ABS, ASTM, Department of Labor and Industries, ASME, AISI, SAE, IEEE or other regularly recognized agency, institution and/or body, those standards form a part of the Contract and that requirement shall be clearly indicated on any Purchase Specification, or order developed and issued by and/or for the Contractor.

All items or materials requiring USCG and Department of Labor and Industries approval shall be on file with the cognizant local USCG Inspection Office and Department of Labor and Industries.

BE ADVISED: ***The Work requires the Contractor to provide deliver of each Vessel with fully operational, and Authoritative Agencies approved and certificated elevators***.

See Section 12 of the Technical Specification for additional HVAC systems labeling requirements.

23.4 PASSENGER ELEVATORS

23.4.1 General

The following are minimum experience, physical, performance, installation support, and training requirements that must be met for the two (2) proposed Passenger elevators.

23.4.2 Minimum Experience

The Contractor or his vendor shall demonstrate a minimum of three (3) years successful experience in the manufacture and maintenance of Passenger elevators of similar marine application meeting ASTM, ASME, ABS or other recognized classification society standards. The Contractor shall provide verifiable documentation to show that it meets this requirement.

23.4.3 Physical Characteristics

The proposed Passenger elevators shall possess the following physical characteristics:

1. Minimum two-thousand pound (2,000 lb.) lift capacity.

2. Car travel 150 (minimum) to 260 (maximum) feet per minute (fpm).

3. Common car and equipment to both fit within the following criteria:

Vessel Class	Hoist way Inside Trunk Dim	Pit Depth	Overhead above Top Landing Deck	Net Travel	Number of Stops
New 144-Auto Ferries	**	**	**	**	4
Lower Vehicle Deck, Upper Vehicle Deck, Passenger Deck, and Sun Deck					

** To be Determined by Contractor's Design.

4. Meet the applicable requirements of:

   a. 46 CFR enforced by US Coast Guard Navigation and Vessel Inspection Circulars (NVIC);

   b. ASME A17.1/CSA B44 –2004, *Safety Code For Elevators and Escalators*, and amendments;

   c. ABS, *Construction Guide For Elevators* except for ladder in Elevator Shaft;

   d. WAC Chapter 296-96, *Safety Regulations for Elevators*, except as modified by this specification; and

e. ASTM F916-85, *Standard Specification for Elevators, Shipboard, Electromechanical Passenger, and Stores*.

5. Meet the requirements for a "Limited-Use/Limited (LULA) Application Elevator" as defined in References (23C) and (23D). Each elevator car shall provide a clear width of forty-two (42) inches (minimum) × a clear depth of fifty-four (54) inches (minimum). The vertical clearance for the doorway and within the car shall be 6 feet - 8 inches (minimum).

6. Provide Interior Communications for each car that is compatible with References (23C) and (23D) and Section 95 of the Technical Specification, as well as Shipboard PA and Interior Communication to the Engineering Operating Station (EOS). Provide hall signals as required by References (23C) and (23D).

7. Entrances to those elevators doors located in weather decks (areas) shall be provided with drain sumps in the surrounding deck area to preclude water entering the elevator shaft. The sumps shall be generally as set forth in WSF Dwg. No. 8102-638-003-02 (*latest revision*) for the M.V. WALLA WALLA PCS Replacement, to suit the Contractor's design, meet all ADA requirements as set forth in References (23C) and (23D), and meet the requirements for thresholds, below. Drain piping size shall be a minimum of 2½ inch IPS. See the *GENERAL* Subsection in Section 2 of the Technical Specification for the definition of Weather Decks.

8. The thresholds at the entrance into each elevator shall meet the accessible route standard for changes in level (References (23C) and (23D), which limits them to ¼ inch in height unless they are bevel. If the latter, they can be no more than ½ inch in height.

9. Provide installation drawings, material lists, calculations and Safety Analysis for approval by WSF (locations reserved for Elevator Machinery Rooms (if applicable) shall be identified in the drawings).

10. Doors shall be horizontal sliding type and have a 1½ hour fire rating in accordance with ASME A17.1/CSA B44 –2004.

11. Openings in the elevator cars shall be both front and rear.

12. Interior décor (colors) of each car to be as approved by the WSF Representative during Phase II design and reflected on the Contractor's Color Boards as set forth in Section 25 of the Technical Specification. Elevator deck coverings shall match

the deck covering of the adjacent Passenger Deck covering in type, style, and color.

13. Provide klaxon bell type emergency alarms.

14. Provide a control panel mounted in a NEMA Type 12 enclosure for control of all position, door and safety functions in a Selective Collective Automatic Mode of Operation.

15. Each elevator shall have a key switch, an emergency override back to the Passenger Deck for Fire Service Phase I and II in accordance with ASME A17.1/CSA B44 –2004. See the *Elevator Controls* Subsection in this Section of the Technical Specification for key lock out requirements.

16. Each elevator shall have a key switch, and independent service override for maintenance and repairs.

17. The elevator car "Emergency Stop" switches shall be of a type, location, and configuration so as to prevent accidental operation, confusion as to function, and meet all ADA and Authoritative Agency requirements.

18. Vendor supplied and installed electrical power and control wiring, including the traveling cables, shall meet the requirements of Section 87 of the Technical Specification and USCG requirements, including the Vertical Tray Flame Test, UL 1581. Cables entering disconnect switches; motor controllers, etc. shall be made with nylon cord grips.

19. The Elevator Control Cabinets shall each be located in a heated, climate controlled space such as a Reduction Gear Room. The location shall permit the Engineering crew access for repairs and emergencies from below the Lower Vehicle Deck. The cabinet locations shall be approved by the WSF Representative.

20. Traveling cables shall contain additional conductors for the announcing system, lighting and the sound powered telephone.

21. Elevator cars PABX telephones shall be Contractor furnished and shall be as set forth in the *Circuit "J", PABX Telephone System* Subsection in Section 95 of the Technical Specification.

22. Each elevator car shall be supplied with a single-speed ventilation fan capable of a minimum of five (5) air changes per hour.

23. A battery operated emergency light, PAULUHN Symbol 101.3, or equal, with rechargeable batteries and an automatic charger shall be provided in each car.

24. A duplex convenience receptacle shall be provided on each car top.

25. Two (2) fuse disconnect switches, NEMA Type 12, without knockouts, all copper current carrying parts (one (1) each for car lighting and one (1) each for the electric motor), complete with fuses, shall be provided.

26. The Contractor shall ensure that absolute coordination of over current protective devices between the ship's supply and the elevator manufacturer's furnished equipment is achieved.

27. The elevator systems shall be operable on the Vessel's normal and emergency back-up electrical power supply of 480Vac, 3-phase, 60 Hz.

28. The elevator systems, including power and controls, shall be protected from transients during switching from primary to emergency electrical supply.

29. Car enclosures shall be fabricated from a steel shell with the following appointments as approved by the WSF Representative:

    a. Interior walls: Plastic laminate lining;

    b. Doors & sills: Brushed stainless steel interior and exterior;

    c. Door trim: Brushed stainless steel, Type 316L;

    d. Ceilings: Metal lay-in ceiling, brushed aluminum or equivalent with recessed light fixtures;

    e. Rails: Stainless steel tube 1½ inch diameter on two (2) sides to serve as ADA compliant handrails; Stainless steel rectangular tube on two (2) sides to serve as a bumper guard; and

    f. Flooring: Slip resistant commercial flooring meeting all requirements of Section 6 of the Technical Specification.

29. The weather top of the elevator trunks shall be provided with a visor around the entire perimeter extending out from the trunk and rolled down to shed water so it will not run down the outside of the shaft. Design shall be of a rolled down

configuration and extend out approximately twelve (12) inches on all sides and approximately six (6) inches down. Prepare the coat the elevator top and visor the same as the Pilothouse visors.

30. The call buttons in all weather areas shall be waterproof switches capable of withstanding a water deluge. Moisture proof switches **do not** meet waterproof requirements.

31. The Contractor shall provide all signage necessary to operate and access the elevator system components. All signage shall meet the requirements of Section 24 of the Technical Specification, and Authoritative agencies.

32. Provide and install cabling for video cameras installed in accordance with Section 95 of the Technical Specification.

23.4.4 Minimum Performance Characteristics

1. Electric motor operating on the ship's service power supply of 480Vac, 3-phase, 60 Hz.

2. Shall operate year round in a machinery compartment having an air temperature of 50F degrees to 104F degrees.

3. Shall be capable of full lift and decent under the following conditions:

   a. Outside air temperature 105F degrees;

   b. Vessel roll to Port or Starboard of 15 degrees;

   c. Vessel pitch fore or aft of 5 degrees; and

   d. List and trim are not concurrent.

4. Shall be able to function within the following electrical parameters:

	Permanent	Transient
Frequency	±5%	± 10% (5 seconds)
Voltage	+6% through -10%	± 20% (1.5 seconds)
Total Harmonic Distortion	5%	10% (1 second)

5. Shall be able to operate without interruption when transferring from primary to emergency power with a duty fault of 18 KVA RMS symmetrical.

6. Shall be outfitted with programmable acceleration/deceleration rates.

23.4.5 Installation and Maintenance Support

The Contractor shall provide all necessary support, design, and materials to the Contractor's elevator manufacturer as required to produce complete, fully functional, and approved elevator systems.

The elevator manufacturer's technical representative shall be local to the Puget Sound area, and able to respond to system service/repair within a twenty-four (24) hour request.

23.4.6 Elevator Installation

The elevators shall be a heavy-duty, marine, and ADA designed to provide wheelchair access and egress from the elevator cars and to allow reduced mobility individuals access between the Lower Vehicle Deck, Upper Vehicle Deck, Passenger Deck, and the Sun Deck.

Car safety stopping systems shall be provided in accordance with the ABS guide.

23.4.7 Elevator Car

Each car shall be equipped with power-operated, center-opening, horizontal sliding door(s) to accommodate wheelchair Passengers. The doors shall be counterweighted. The doors shall be equipped with a protective edge, which reverses the door motion if an obstacle is encountered while closing. A multi-beam infrared photoelectric system shall be employed on the doors to prevent the door's closing if an obstruction blocks any photoelectric beam. The photoelectric beams shall be installed on the fixed side of the

door assembly. The door control logic shall include an adjustable time delay, holding the doors open for any duration between four (4) and fifteen (15) seconds.

Car equipment includes as a minimum: controls, a sound-powered phone, hand rails, fluorescent car lights and battery powered emergency lights with charger, ventilation fan, car maintenance hatch, and all additional fixtures to meet the requirements of References (23C) and (23D) including all audio and visual alarms.

An outward-opening, removable maintenance hatch shall be located in each car ceiling and interlocked to completely remove power from the hoisting machinery (but not the lighting system) unless the hatch is closed and locked. The escape hatches shall be provided with a manual reset. Folding steps shall be provided in each car to provide access to the hatch.

A car-top inspection station shall be provided with a light and AC power receptacle located on the roof of each car for use during servicing and repair.

Control locations, arrangement and signage shall comply with the requirements of References (23C) and (23D) and Authoritative Agencies.

Controls shall be elevator manufacturer supplied as an integral part of each car assembly.

23.4.8 Elevator Controls

Elevator controls shall be designed and connected as required by the elevator manufacturer and the Authoritative Agencies. These shall include call stations at the deck levels, stop switches in the car and pit, over-travel limit switches, supervisor's controls and car assembly controls. Control systems shall be elevator manufacturer installed with the power source supplied by the Contractor.

Elevator controls shall be interfaced with an industry standard, heavy-duty, programmable logic controller (PLC) suitable for shipboard ambient noise levels. Ladder diagrams, flow charts, and commented source codes for the PLC specific to the system installation shall be provided by the elevator manufacturer. The PLC shall have gold contacts, and shall have permanent memory.

The control panels shall include a key-operated switch to lock an individual elevator out of service, and to lock out the Sun Deck level by the Crew without reprogramming the system.

Operation of elevators shall be automatic by means of the car and landing buttons. Stops registered by the momentary actuation of the car or landing buttons shall be made in the order in which the landings are reached in each direction of travel after the buttons have been actuated. All stops shall be subject to the respective car or landing button being actuated sufficiently in advance of the arrival of the car at that landing to enable the stop

to be made. The direction of travel for an idle car shall be established by the first car or landing button actuated.

"UP" landing calls shall be answered while the car is traveling in the up direction and "DOWN" landing calls shall be answered while the car is traveling down. The car shall reverse after the uppermost or lowermost car or landing call has been answered, and proceed to answer car calls and landing calls registered in the opposite direction of travel.

If all calls in the system have been answered, the car shall park at the last landing served.

Supervisor's controls shall consist of a key-operated, "OFF/ON" switch at the Lower Vehicle Deck control station which can be used to lock out the "CALL" pushbutton at all control stations during emergency or test procedures.

Elevator pits shall be provided with pit switches for locking each elevator when out of service.

23.4.9 Access-way Doors

When open, the elevator doors shall present a clear opening of at least forty-two (42) inches to accommodate wheelchair Passengers.

The doors shall be interlocked so that normal car operation is prevented if a door is open.

23.5 TRAINING

The Contractor, working with his elevator manufacturer's technical representative, shall produce and submit a training plan syllabus to the WSF Representative for review and approval, detailing curriculum elements. The Contractor shall provide training in accordance with the requirements of Section 1 of the Technical Specification and shall follow the approved syllabus plan. The Contractor shall provide Onboard Training for operation, troubleshooting, maintenance, and repair of the Passenger elevators prior to each Vessel being placed into service.

The Contractor shall also prepare all comprehensive training manuals in accordance with the approved Onboard Training and Independent Training course outlines for both classes. These training manuals shall be used during training periods and (for Onboard Training) remain the property of each student for later reference. The training manuals shall be submitted for WSF approval at least thirty (30) calendar days prior to the beginning of classroom training.

Minimum elements of the Training Plan shall include:

A. Onboard Training - The Contractor shall provide four (4) training sessions conducted by the elevator manufacturer's technical representative for each Vessel for

up to ten (10) WSF crewmembers per session. See the *TRAINING OF WSF PERSONNEL* Subsection in Section 1 of the Technical Specification for additional requirements.

B. Independent Training - The Contractor shall provide an elevator manufacturer's technical representative approved self-study guide for independent training for WSF use after the Onboard Training program is complete. The Contractor shall utilize personal computer-based training (e.g., video files on a CD-ROM or DVD-ROM), or other such instructional tools to either fulfill or enhance this Independent Training requirement. Two (2) complete sets of Independent Training materials shall be provided per Vessel. The elevator manufacturer's technical representative shall describe their Independent Training plan in a syllabus as part of the overall Training Plan submittal.

NOTE: Regarding the quality of the submittals, Training Plans shall be characterized by a high degree of completeness, clarity and ease of use as set forth in the *TECHNICAL PUBLICATIONS* Subsection in Section 100 of the Technical Specification.

23.6 CLEANING AND FLUSHING

Tests and/or trials shall be in accordance with this Section and Section 101 of the Technical Specification.

Inspections shall be performed as defined in this Section and Sections 1 and 2 of the Technical Specification.

23.7 SPARE PARTS AND INSTRUCTION MANUALS

Provide an itemized price list of recommended spare parts, special tools, and testing/diagnostic equipment for the elevator systems, together with parts lists and instruction manuals (see the *TRAINING* Subsection in this Section of the Technical Specification) necessary to maintain and service provided equipment and accessories in accordance with the requirements of Sections 86 and 100 of the Technical Specification.

The elevator manufacturer shall provide a detailed analysis of all service action required for a period of ten (10) years based on a yearly operation of 4,000 hours per Passenger elevator. This analysis shall include the expected part usage and the amount of labor hours required for each action.

WSF may, at its sole option, purchase all or some of the spare parts, special tools and testing/diagnostic equipment from the above itemized price lists to be provided for the Passenger elevators. Any such procurement shall be by separate Purchase Order. **Prices for**

such optional spare parts, special tools and testing/diagnostic equipment shall remain in effect for two (2) years after delivery of the last Vessel of this Contract.

23.8 TESTS, TRIALS AND INSPECTIONS

Test the electrical circuits and insulation resistance as required.

Operate each elevator car and adjust track alignment as necessary, so that no binding or rough running occurs. Set the position of the limit switches and other control and safety devices as directed by the elevator manufacturer's technical representative.

Each elevator shall pass an inspection as conducted by WSF Representatives, Washington State Department of Labor & Industries and the USCG with the assistance of the elevator manufacturer's technician. All defects and/or omissions shall be corrected before acceptance. Acceptance tests in accordance with elevator manufacturer's technical representative shall be completed.

Required certificates/licenses shall be mounted under framed glass in each elevator prior to delivery of each Vessel.

Test all equipment as required by this Section and Section 101 of the Technical Specification.

Inspections shall be performed as defined in this Section and in Sections 1 and 2 of the Technical Specification.

23.9 PHASE II TECHNICAL PROPOSAL REQUIREMENTS

The following deliverables, in additions to other deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase II Technical Proposal stage of Work in accordance with the requirements of Section 100 of the Technical Specification:

A. Passenger Elevators Manufacturer’s Drawings

B. Safety Analysis

Passenger Elevators Manufacturer’s Drawings shall show the shipboard location, elevator/structure interface, mechanical and electrical systems, and openings.

23.10 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS

The following deliverables, in additions to other deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase

III Detail Design stage of Work in accordance with the requirements of Section 100 of the Technical Specification:

A. Passenger Elevators Maintenance Plan

B. Elevator electrical diagrams, flow charts, and commented source codes from the elevator manufacturer

C. Training Plans

The ***Passenger Elevators Maintenance Plan*** shall outline how service and repair work would be performed and accomplished for the Vessel, both when operating in normal system routes. This plan shall include the details of spare parts availability, response time for service personal, and a preventive maintenance plan for the vendor and crew to carry out, so as to maintain the elevator in continuous operation.

(END OF SECTION)